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## Assessing University-Based Research: Advocating Best Practice

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# Assessing University-based Research: Advocating Best Practice

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German Science Council/German Stifterverband Conference, Bonn

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Higher Education  
Policy Research Unit

# Content of Presentation

1. Setting the Context
  - Policy Framework
  - Changes in Knowledge Production
2. Challenge of Assessing University-based Research
3. Good Practice

# 1. SETTING THE CONTEXT

# Achieving Lisbon

- Globalisation and intensification of competition between nations has underpinned increasing investment in HE and R&D – especially in response to economic crisis;
- Rankings have been game-changer intensifying cross-national comparisons;
  - Revolutionizing impact on (self)perceptions of “world order”, tracking shifts in competitive strengths and weaknesses of nations through performance and attractiveness of universities;
- High-performing competitive HEIs and university-based research lies at the heart of policy to make EU *"the most competitive and dynamic knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion"* (Lisbon, 2000);
  - Bologna and EHEA: comparability, mobility, transparency, accountability, quality;
  - Lisbon and ERA: competitiveness, world-class excellence, attractiveness;
  - Innovation Union: conversion of knowledge into products and services.

# Focus on Quality and Excellence

- “It is the quality of European higher education institutions, measured (among other ways) through the volume and scope of institutions' scientific - in the widest sense of the word - and technological research activities, which is crucial.” (EU Communication on strengthening cooperation with third countries in the field of higher education /\* COM/2001/0385 final \*/ , 2001);
- “Universities should be funded more for what they do than for what they are, by focusing funding on relevant outputs rather than inputs...” (EU, *Delivering on the modernisation agenda for universities: Education, research and innovation* of 2006, p7);
- The “challenges posed by globalisation require that the European Higher Education Area and the European Research Area be fully open to the world and that Europe's universities aim to become worldwide competitive players” (EU, *Modernising Universities for Europe's Competitiveness in a Global Knowledge Economy*, 2007, p3);
- “Europe must act: ... According to the Shanghai index, only two European universities are in the world's top 20” (EU, *Europe 2020. A European strategy for smart, sustainable and inclusive growth*, 2010, p10 ).

# Changes in Knowledge Production

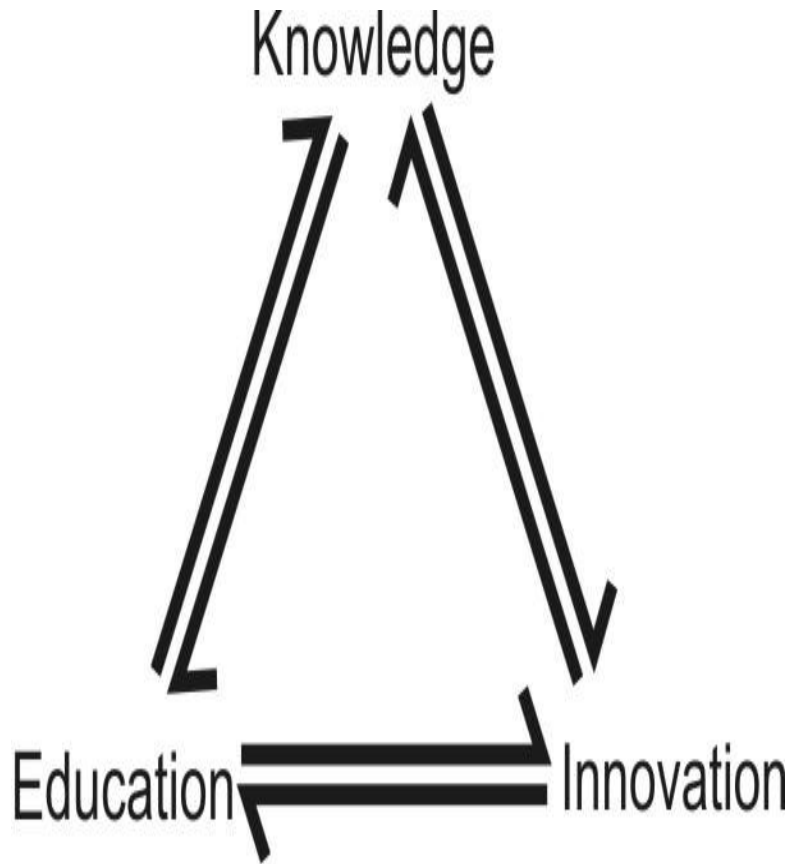
- Progression from simple to complex knowledge has led to:
  - Emergence of new disciplines, methodologies and ways of thinking;
  - Transformation in way knowledge is created, by whom/where and how used.
- Traditionally, knowledge production divided simplistically and hierarchically between basic/fundamental research and applied.
- Today, boundaries blurring, and research increasingly conducted in the context of application, both within and outside universities:
  - Translation of findings into new/improved products and services is integral part of the research process – which is seen as a continuum;
  - Knowledge democratized in sense that more people are aware of the issues, involved in the process, and social actors in its application.
- Severity of the global economic crisis has reignited debate about being accountable and ensuring value-for-money and return on (taxpayer) investment: assessing value, impact, and benefit of research.

# Broader understanding of knowledge

Mode 1	Mode 2	Mode 3
<p>Pursuit of understanding of fundamental principles focused around “pure disciplines” and arising from curiosity, with no (direct or immediate) commercial benefits.</p> <p>Conducted by a limited number of research actors in secluded/semi-secluded environment.</p> <p>Achieves accountability via peer-review process.</p> <p>(Gibbons et al, 1994)</p>	<p>Identifying principles required to solve practical problems of modern world, in addition to acquiring knowledge for knowledge’s sake.</p> <p>Broad range of research actors across breadth of disciplines/fields of inquiry.</p> <p>Achieves accountability via a mix of peer and social accountability.</p> <p>(Gibbons et al, 1994)</p>	<p>Formation of bi-lateral, inter-regional and global networks, not bound by borders or discipline to solve complex problems.</p> <p>Knowledge production is democratised with research actors extending/involving “beyond the academy”.</p> <p>Emphasis on “reflective knowledge”/engaged scholarship co-produced with/responsive to wider society, with an emphasis on impact and benefit.</p> <p>Achieves accountability via social and public accountability.</p>



# Knowledge Triangle



EU aims to overcome fragmentation of knowledge system to encompass ‘the whole innovation chain from education to economic impact’ (European Commission COM 24 final) (2005),

“Smart growth means strengthening knowledge and innovation as drivers of our future growth. This requires improving the quality of our education, strengthening our research performance, promoting innovation and knowledge transfer throughout the Union”. (EU, *Europe 2020*, 2010, p13).

## **2. CHALLENGE OF ASSESSING UNIVERSITY-BASED RESEARCH**

# What do Users Want to Know?

- Institutional/field data re. level of intensity, expertise, quality and competence;
- Efficiency level: how much output vis-a-vis funding;
- Quality of faculty and PhD students;
- Attraction capacity and internationalisation;
- Research infrastructure: level of use and efficiency;
- Employability of graduates: trends and competences
- Impact of research on teaching, staff/student ratio;
- Research capacity of HEI & research team;
- Performance benchmarked regionally, nationally & internationally.

# Users and Purposes

	Publications Outputs	Quality & Scholarly Output	Human Capital	Investment	Economic & Social Benefit	End-User Esteem
HE Management	X	X	X			X
Regional/ National Governments	X	X	X	X	X	
Individual Researchers	X	X				
Peer HEIs	X	X	X			
Industry		X			X	X
Public Opinion		X	X	X	X	

# Changing practices

Once research is seen to have value and impact beyond the academy – for global positioning and for economic development/recovery – there are implications for what is funded, research organisations/management, and how it measured and by who;

- Balance between
  - Human capital development vs. economic/industrial strategy;
  - National priorities vs. Researcher curiosity;
  - Selectivity (funding excellence wherever it exists) vs. Concentration (targeted funding to strengthen capability/build scale);
  - New and emerging fields/HEIs vs. Existing strengths;
- Shift from
  - Measuring inputs and outputs to benefit and relevance;
  - Relying on bibliometrics and citations to wider range of methodologies;
  - Peer accountability to social accountability.

# Assessment Methods(1)

1. Bibliometrics: quantifying peer publications is most common, BUT:
  - Identifies only selection of peer-reviewed journal articles – and favours physical, life, and medical sciences;
  - Different disciplines have different practices and produce different types of research outputs;
  - Cross-disciplinary and collaborative research difficult to categorise;
  - Benefits countries/institutions where English is native language;
  - Emphasis on global impact undermines importance of regionally or culturally-relevant outcomes;
  - Emphasis on past performance rather than potential – thus, new research fields, inter-disciplinary research or ideas which challenge orthodoxy find it difficult to be published;

# Assessment Methods(2)

- Citations: measure scientific impact by measuring number of times a work is cited by others, BUT:
  - Journal impact factors (JIF) can be manipulated and are strongly affected by differences among research fields.
  - Reputational or halo factor leads to certain authors being quoted.
- Peer Review: requires detailed understanding to evaluate the methodological soundness and (potential) significance, BUT:
  - Evaluators work in terms of what and who they know;
  - Academics act as ‘gatekeepers’ of new knowledge and methodologies;
- Self-Evaluation: critical assessment of own performance and provision which enables research to be put into context, BUT
  - Objectivity can often be difficult to establish and maintain;

# Assessment Methods(3)

- Impact and Benefit: emerging methodologies using case studies, end-user opinion, and relevant indicators, BUT:
  - Demonstration of economic impact can lead to a focus on short-term job creation and innovation narrowly favouring science and technology disciplines, perversely affecting the choice of research topics and project design.
  - Timelines over which “impact” and “influence” are assessed are problematic;
  - Evidence can be difficult to verify.
- Rankings: uses a range of weighted indicators to establish a hierarchy of performance, BUT
  - Emphasis on quantification as proxy for quality;
  - Performance across range of indicators/categories aggregated into a single digit in descending order;
  - Essentially one-dimensional, as each indicator is considered independently from the others – whereas in reality multicollinearity is pervasive.



# Are We Measuring What Counts?

Indicator	Metric	Pro	Con
Research Publications and Outputs	e.g. Total number of peer publications	Measures & Improves Activity	Basis not always clear
Quality and Scholarly Impact	e.g. Citations; High Impact Publications	Measures & Improves Quality	Which journals? Most effective in English-language.
Human Capital	e.g. PhD completions; output/FTE or active researcher	Measures Timeliness of completion & Productivity	Differences between disciplines
Investment	e.g. Income & donations	Predictor of performance	Difficult to get valid comparable data
Economic and Social Benefit	e.g. Commercialised IP & employability	Link between R and D	Time-lag and context
End-User Esteem	e.g. Appointments to high level orgs.	Measures reputation	Time-lag and difficult to verify
Research Infrastructure	e.g. Library & research space	Measures capability	Difficult to get valid comparators

# Unintended Consequences

- Metrics ignore differences between disciplines – outputs and impact;
- Impact factor has negative consequences for scientists as they make decisions about how to do science, publish their work, and apply for positions;
- Peer review can also act as ‘gate-keepers’;
- Evaluation systems often contrary to policy needs:
  - Metrics measure past performance rather than potential;
  - Bibliometrics fails to capture activity across the full research-innovation eco-system;
- Reliance on data that is easily measured rather than what should be measured can distort research towards that which is more predictable;
- Emphasis on global impact can undermine importance of regionally relevant outcomes.

# 3. GOOD PRACTICE

# Why assess research?

- Cross-national comparisons are inevitable by-product of globalization and will intensify in the future;
- Systems and HEIs must be accountable and responsible – whether dependent on public or private funding;
  - Transparency debate is accelerating and HE risks losing all control over definitions of quality.
- Measuring research, faculty performance and productivity, student learning outcomes etc. is unquestionably important;
- Good quality, international comparative information is essential to underpin strategic leadership and decision-making at the national and institutional level;
- Enable countries/universities to gain a greater understanding of their own situation by learning from/sharing experience and “good practice”.

# Democratizing knowledge

- Wider dissemination and adoption of research by society requires new tools:
  - Open source;
  - Digital repositories
  - Web-based tools, e.g. Google Scholar
- Democratizes knowledge production through greater public accessibility and transparency of scientific communication.
  - Peer-review can no longer be the sole or primary method by which research is assessed;
  - End-user or stakeholder esteem becomes a vital component ;
  - Broader range of indicators and methodologies required.

# Indicators must be fit for purpose

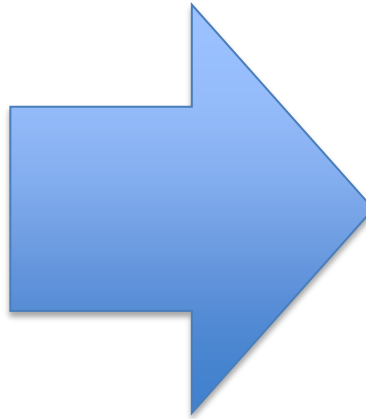
- Underpinning national social and economic development/recovery;
- Improvement of research performance;
- Improvement of teaching – via impact of research on teaching;
- Allocation of resources;
- Attraction of talent;
- Promotion of innovation;
- Engagement with business;
- Driver of mission differentiation;
- Concentration of research;
- Etc.

# Research Outputs/Impact

- Journal articles

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- Book chapters
- Computer software and databases
- Conference publications
- Editing of major works
- Legal cases, maps
- Major art works
- Major works in production or exhibition and/or award-winning design
- Patents or plant breeding rights
- Policy documents or brief
- Research or technical reports
- Technical drawings, designs or working models
- Translations
- Visual recordings



- Peer Esteem

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- Impact on Teaching
- Improved Productivity, Reduced Costs
- Improvements on environment and lifestyle
- Improving people's health and quality of life
- Increased employment
- Informed public debate
- New approaches to social issues
- New curriculum
- Patents, Licenses
- Policy change
- Social innovation
- Stakeholder esteem
- Stimulating creativity

# Social & Economic Impact

- ***Economic Benefits***, e.g. improved productivity; adding to economic growth and wealth creation; enhancing the skills base; increased employment; as well as unquantifiable returns resulting from social/policy adjustments.
- ***Social Benefits***, e.g. improving people's health and quality of life; stimulating new approaches to social issues; changes in community attitudes; influence upon developments or questions in society at large; informed public debate and improved policy-making;
- ***Environmental Benefits***, e.g. improvements in environment and lifestyle; reduced waste and pollution; improved management of natural resources; reduced consumption of fossil fuels; and adaptation to climate change;
- ***Cultural Benefits***, e.g. supporting greater understanding of where we have come from, and who and what we are as a nation and society; contributing to cultural preservation and enrichment; and bringing new ideas and new modes of experience to the nation.



### **Select Indicators re teaching and learning:**

- Text books and lecture materials sold
- Reviews of publications by students on the internet
- Courses for students abroad
- Graduate student numbers – PhD and Masters
- PhD completion rates and time to completion
- Graduate Masters students and their first jobs
- Internationalization: students and academics
- Student satisfaction surveys

### **Select Indicators re research activity:**

- Publications in scientific journals/international journals
- Citations of publications by peers in scientific journals
- Reviews of publications by peers on the internet
- Cooperation with peers, e.g. contributions to courses
- Scientific awards
- Number of monographs
- Keynote speeches and invited lectures
- Editorship of scientific journals
- Invitations by journals to review scientific publications
- Invitations to contribute to special issues or collections
- Received grants
- Co-operation with international networks
- Number of visiting lecturers
- Published conference papers
- Development of research data base
- Significant national or international conferences
- International reviews participated in
- Membership of international bodies
- Awards and prizes

### **Select Impact Indicators re. policy makers :**

- Publications via dissemination channels of policy makers
- Citations of publications by policy makers in reports, etc.
- Reviews of publications by policy makers
- Cooperation with policy makers
- Lectures for policy makers
- Memberships of bodies advising policy makers.
- Grants received from policy makers

### **Select Impact indicators re business and professions:**

- Patents, licensing, company formation, etc.
- Publications
- Citations of publications in their dissemination channels.
- Reviews of publications
- Collaborative research
- Grants received
- Lectures for business community.
- Memberships of bodies advising business community.
- Awards.
- Memberships of prestigious organizations.

### **Select Indicators re public/community engagement :**

- Publications via public channels
- Citations of publications in media
- Reviews of publications by broader public
- Contribution to public meetings and exhibitions
- Awards by the broader public
- Lectures for public audiences
- Grants received
- Historical research leading to preservation of media and/or other cultural artefacts;
- Enhancement of performing arts quality/scope resulting as indicated by greater public participation and satisfaction captured by the audience surveys;
- Contribution to policy outcome producing measurable significant or outstanding benefit.

# Good practice

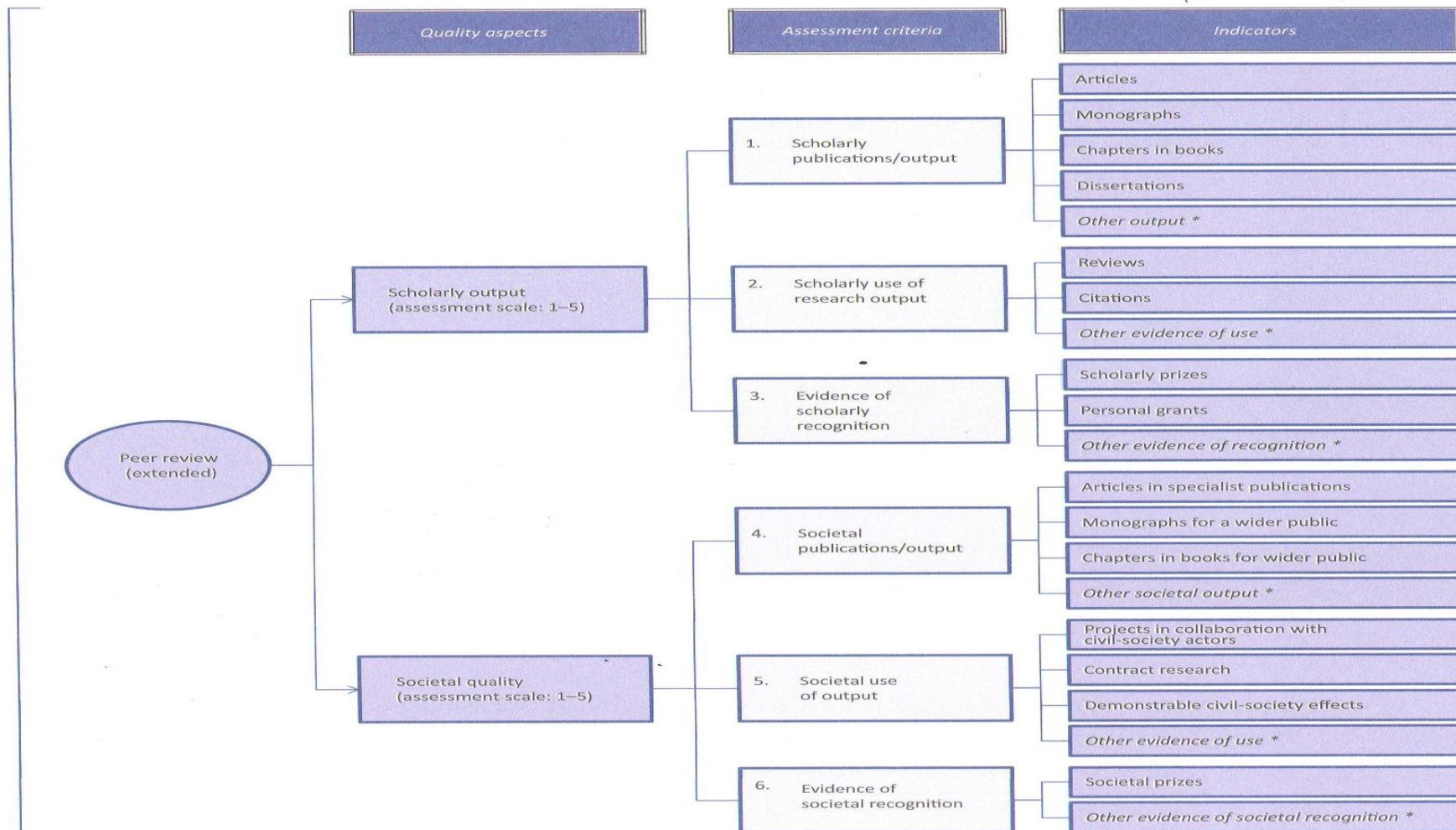
- ***Combine indicator-based quantitative data with qualitative information***  
Quantitative information tested/validated within the context and purpose of assessment, with appropriate reference to discipline/disciplinary practice.
- ***Recognise important differences across research disciplines.*** Peer-reviewed journal articles are primary publication channel, but complexity of knowledge has led to a diverse range of output formats and outlets.
- ***Include assessment of impact and benefits because research does not exist in isolation.*** This differs for different disciplines.
- ***Integrate self-evaluation.*** Useful way to include research community in assessing own contribution, but also as means of placing research process into context and related to institutional mission.

# UK and Australia

- UK Research Assessment Exercise (RAE) undertaken approx. every 5 years since 1986; beginning 2014, Research Excellence Framework (REF):
  - *Outputs*: ‘originality, significance and rigour’, with reference to international research quality, 65%;
  - *Impact*: ‘reach and significance’ of impacts on economy, society and/or culture, 20%;
  - *Environment*: ‘vitality and sustainability’, 15%.
- Australia began testing Research Quality Framework (RQF) in 2005 to demonstrate research influence on a discipline area/wider community.
  - New initiative using case studies currently being trialled; report due 2012;
  - Equal consideration to excellence in research across spectrum of applied, practice-based and basic/strategic research, wherever that research is conducted;
  - Assessment criteria: research quality, esteem, environment, impact.

## SKETCH OF A SYSTEM OF QUALITY INDICATORS FOR THE HUMANITIES

The system will be tested in 2011 in two pilot studies at Meertens Institute  
Amsterdam and Groningen Research Institute for the Study of Culture (ICOG).



\* discipline-specific/context-specific indicators

# Key Challenges

1. How do we fairly and accurately measure and compare performance across different disciplines?
2. How do we ensure international comparability of new fields and national policy needs?
3. How can we measure social and economic impact, and do this fairly over-time?
4. How do we measure potential – rather than concentrating on past performance?
5. Can we combine quantitative and qualitative methodologies in cost and time effective way?
6. What timeline is appropriate?
7. Which data?

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